

CUMULATIVE GROWTH INDUCEMENT STUDY for the Highway 1 Corridor

From San Andreas-Larkin Valley Roads to Morrissey Boulevard
05-SCR-1, PM R733 (KP 11.79) 7.6 to PM 16.13 (KP 25.96)
Santa Cruz County, California

EA: 05-0C7300, 05-0F6500



Prepared by the
U.S. Department of Transportation
Federal Highway Administration and the
State of California Department of Transportation

September 2008



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Chapter 1 Introduction

1.1 Overview

Growth related impacts are indirect effects associated with highway projects that encourage or facilitate land use or development that changes the location, rate, type or amount of growth compared with what is planned. Growth-related impact analysis is typically needed in the environmental document for those highway projects that are built along a new alignment and/or provide new access or capacity. Adding High Occupancy Vehicle (HOV) lanes or mixed-flow lanes are examples of projects that could cause growth-related impacts because they add capacity to an existing facility and warrant a closer consideration to determine whether an analysis of growth-related impacts will be necessary.

This growth inducement analysis reviews the growth inducement potential of the proposed Highway 1 HOV Lane Widening Project. This study also reviews growth-inducing impacts cumulatively for this project plus the Highway 1 Auxiliary Lanes Project, which would add auxiliary lanes on Highway 1 from Morrissey Boulevard to Soquel Avenue. The HOV Lane project includes the Soquel to Morrissey project as part of its no-build conditions.

The assessment addressed the following three sets of questions:

1. What is the reasonably foreseeable growth and land use change without the projects? What is it with the projects?
2. To what extent will the projects influence the overall amount, type, location, or timing of that growth?
3. Will projects-related growth put pressure on or cause impacts to environmental resources of concern?

A gravity model is used to compute the changes in accessibility to jobs that could result from the proposed improvements.² The model compares commute times to all job centers in the region with and without the project. Growth-related factors including those provided in general plans for the neighboring cities have also been taken into consideration. These factors are described in Chapter 3 and are essential for considering local and regional growth in the context of current and projected land uses, transportation projects and other issues or trends such as attitude towards growth, existing and projected growth trends, and resource and infrastructure constraints.

¹² I. Hirschman and M. Henderson, "Methodology for Assessing Local Land Use Impacts of Highways." *Transportation Research Record 1274*, Transportation Research Board, Washington, DC., 1990.

1.2 Report Organization

The remainder of this chapter describes the transportation improvements and alternatives proposed for Highway 1. The methodology used for this study is described in Chapter 2. Chapter 3 describes the growth factors, study area and land use plans reviewed for this study. Chapter 4 presents the analytical results from the growth model. Chapter 5 describes the findings of the expert panel, after the expert panel review of the study results. Chapter 6 presents the overall assessment and conclusions from this study.

1.3 Proposed Transportation Improvements

The primary proposed corridor improvement and the project with the greatest potential for growth inducement is the Highway 1 HOV Lane Widening Project. The HOV Lane project is currently undergoing environmental review and will circulate its draft environmental document in 2009. The proposed Soquel to Morrissey Auxiliary Lanes Project is planned to precede the HOV Lane project and will circulate its environmental document in fall 2008. The project description below focuses on the HOV Lane project and includes a description of the Auxiliary Lanes project in its no-build conditions. Because the environmental document for the HOV Lane project is in early drafts, the description below should be considered preliminary.

1.3.1 Highway 1 HOV Lane Widening Project

Highway 1 is the primary route connecting communities in the southern and central areas of Santa Cruz County and is the only continuous commuter route linking Watsonville, Capitola, Aptos, Cabrillo College, Santa Cruz and the University of California at Santa Cruz. Approximately one quarter of commuters using Highway 1 continue on Highway 17. Highway 1 also is the southern terminus for State Routes 9 and 17, which bring heavy tourist traffic to coastal destinations in Santa Cruz and Monterey Counties. Highway 1 is a High Emphasis Route in the Caltrans Interregional Transportation Strategic Plan.

The 2001 Regional Transportation Plan identified widening Highway 1 as the highest priority project due to the need for traffic congestion relief in the highly traveled highway corridor. Since the 2005 RTP is a minor update of the 2001 RTP, widening Highway 1 is still regarded as a high priority project³. Based on 2007 data, Annual Average Daily Traffic (AADT) ranges from 68,000 vehicles per day at Larkin Valley Road to 108,000 vehicles per day between the Soquel Drive and Morrissey Blvd. interchanges.

The California Department of Transportation (Caltrans), in cooperation with the Federal Highway Administration (FHWA) and the Santa Cruz County Regional Transportation Commission (SCCRTC), propose to improve Highway 1 for 9.0 miles (14.5 kilometers), from about 0.4 miles (0.6 kilometers) south of the San Andreas-Larkin Valley Road Interchange to 0.3 miles (0.4 kilometers) north of the Morrissey Boulevard Interchange.

³ 2005 Regional Transportation Plan, SCCRTC, May 2005 http://www.sccrtc.org/rtp_2005final.html

Figure 1 below shows the project location and Figure 2 illustrates the project vicinity. Caltrans, along with the FHWA and the SCCRTC, consider the development of HOV facilities a viable strategy for increasing travel efficiency by encouraging the use of buses and carpools, enhancing inter-modal transportation options, and relieving congestion. Traffic studies indicate the new HOV facilities will provide users with substantial time savings, while the mixed flow lanes will change little compared with existing conditions. This strategy will also help minimize environmental impacts to the project area by reducing exhaust emissions and confining the majority of new construction to the existing right of way.

1.3.2 Description of Alternatives

The Highway 1 HOV Lane Widening Project proposes to provide 14.5 kilometers (9.0 miles) of new HOV facilities on Highway 1 between Aptos and Santa Cruz to reduce congestion, encourage carpooling and use of alternative transportation modes as a means to increase transportation system capacity, and improve safety. The project limits of the HOV Lane Widening Project are from the Larkin Valley Road/San Andreas Road interchange to the Morrissey Boulevard interchange, which encompass the project limits of the Soquel to Morrissey Auxiliary Lanes Project.

Three alternatives are currently under consideration, a No-Build Alternative, a Transportation System Management (TSM) Alternative, and an HOV Lane Alternative as described below. The proposed project includes the Soquel to Morrissey project as part of no-build conditions.

No-Build Alternative

The No-Build Alternative offers a basis for comparison with the TSM and HOV Lane Alternatives in the future analysis year of 2035. It assumes no major construction on Highway 1 through the project limits other than planned and programmed improvements and continued routine maintenance. In addition to the Highway 1 Auxiliary Lanes Project from Soquel Avenue to Morrissey Boulevard, planned and programmed improvements included in the No-Build Alternative incorporate the following improvements contained in the 2005 Regional Transportation Plan (RTP):

- Installation of median barrier on Highway 1 from Freedom Boulevard to Rio Del Mar Boulevard.
- A number of locally sponsored projects to improve the local arterial network and to construct and improve bicycle lanes.

Figure 1: Project Location

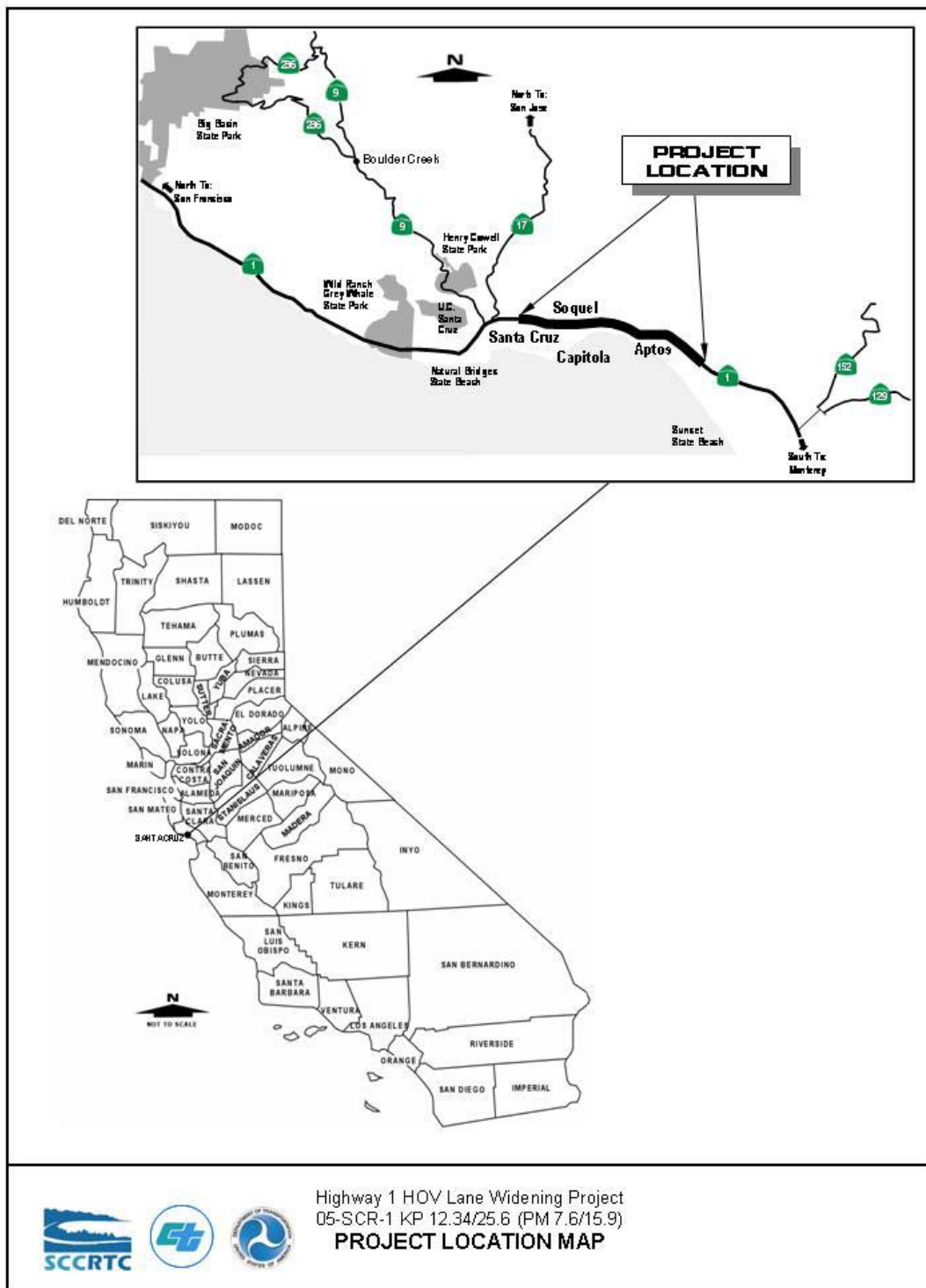
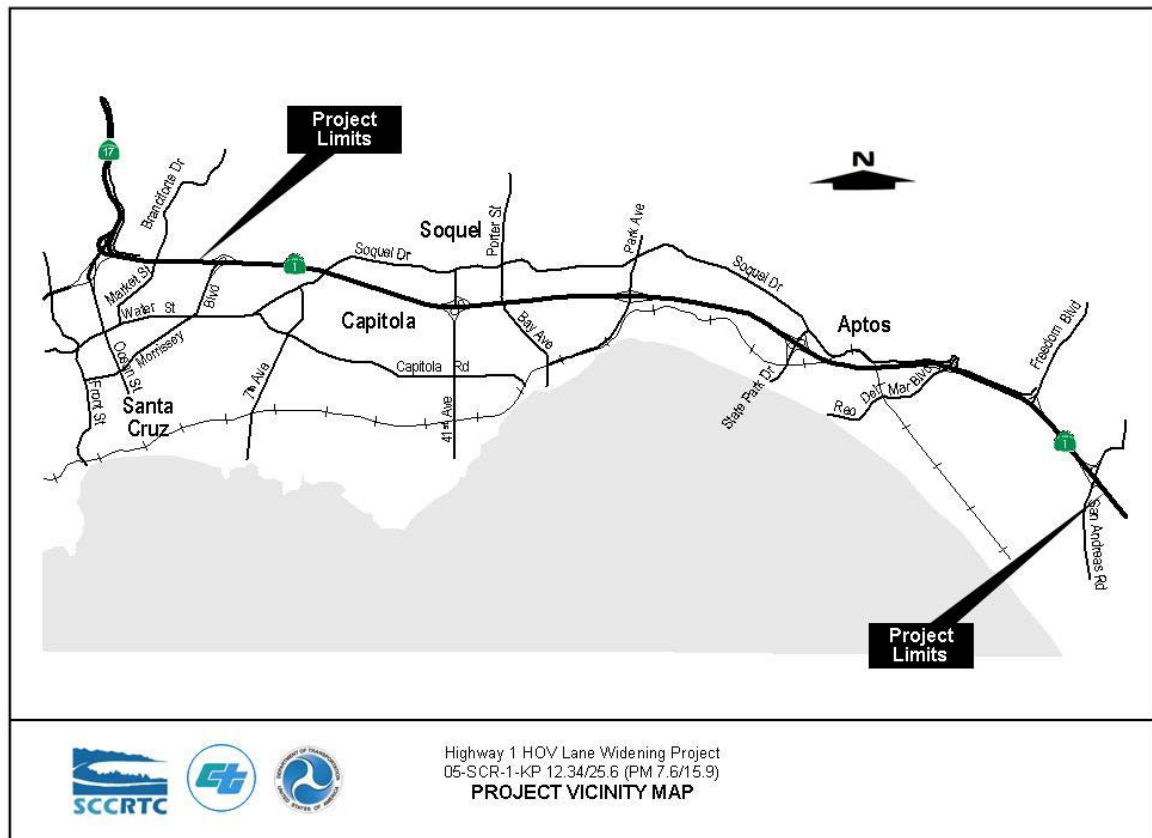


Figure 2: Project Vicinity

The Highway 1 Auxiliary Lanes Project would add one 12-foot-wide auxiliary lane from the Soquel Avenue on-ramp to the Morrissey Boulevard off-ramp in the northbound direction and extend a 12 foot-wide outside lane between La Fonda Avenue and the Soquel Avenue off-ramp in the southbound direction. An auxiliary lane extends from the on-ramp of one interchange to the off-ramp at the next interchange and is designed to separate traffic movements entering and exiting the freeway from mainline traffic. It is not designed to carry through traffic. On southbound Highway 1, the new 1.3-mile outside lane being constructed with the State Route 1/ State Route 17 Merge Lanes Project would be extended 0.3 miles from north of the La Fonda Avenue overcrossing to the Soquel Avenue exit ramp. This extended lane would be “exit only” at Soquel Avenue, and the widening would eliminate the outside lane-drop north of La Fonda.

Transportation System Management (TSM) Alternative

The TSM Alternative proposes ramp metering on existing interchange ramps with auxiliary lanes constructed between the following interchanges:

- Freedom Boulevard and Rio Del Mar Boulevard
- Rio Del Mar Boulevard and State Park Drive
- State Park Drive and Park Avenue
- Park Avenue and Bay Avenue–Porter Street
- Bay Ave- Porter Street to 41st Street (southbound only)
- 41st Avenue and Soquel Avenue–Soquel Drive

Auxiliary lanes are designed to reduce conflicts between traffic entering and exiting the highway by connecting from the on-ramp of one interchange to the off-ramp of the next; auxiliary lanes are not designed to serve through traffic. The TSM Alternative also would include transit enhancements such as park and ride lots and Transportation Operations System (TOS), electronic equipment such as changeable message signs and vehicle detection systems. The interchanges would be modified to provide HOV bypass lanes on the on-ramps.

The north and south Aptos railroad underpasses and the State Park Drive, Capitola Avenue, and 41st Avenue overcrossings would be reconstructed. The Aptos Creek and Soquel Creek bridges would be widened. Pedestrian/bicycle overcrossings would be constructed across Highway 1 at Trevethan Avenue, Chanticleer Avenue, and Mar Vista Drive. This alternative would not include HOV lanes or any additional through lanes on the mainline.

HOV Lane Alternative

The HOV Lane Alternative would widen the existing four-through lane highway to a six-through lane facility by adding an HOV lane in the median in both the northbound and southbound directions. Along the southern portion of the project, the median generally is wide enough to incorporate the new HOV lanes within the existing right-of-way. Along the northern reach of the project, where the median is narrower, widening would occur. In some locations this widening would extend outside the existing right-of-way.

This HOV Lane Alternative would modify or reconstruct all nine interchanges within project limits to improve merging operations and ramp geometrics, lengthen acceleration and deceleration lanes, and improve sight distances. Bridge structures, including the two existing railroad underpass structures and the Capitola Avenue Overcrossing, would be modified or replaced to accommodate highway widening. Roadway crossing structures would include shoulder and/or sidewalk facilities to accommodate pedestrians and bicycles. The HOV Lane Alternative would include pedestrian/bicycle overcrossings of the highway at Trevethan Avenue, Chanticleer Avenue, and Mar Vista Drive, as described under the TSM Alternative. It would also include ramp metering and auxiliary lanes between interchange ramps and TOS electronic equipment, as described under the TSM Alternative with the exception that an auxiliary lane would not be constructed northbound between State Park Drive and Park Avenue. Transit improvements would include park and ride lots at locations to be

decided under a separate project. Bus stops with pedestrian access to local streets would be constructed at some highway ramps to facilitate faster and easier highway access for buses.

Under both the TSM and HOV Lane alternatives, retaining walls would be constructed at the most effective and visually appropriate locations to minimize right-of-way acquisition, reduce or avoid environmental impacts, and separate frontage roads from the highway. The project also would include demolition and disposal, excavation, borrow and fill, sound walls, right-of-way acquisition, and temporary easements.

Chapter 2 **Summary of Study Methodology**

2.1 Need for a Growth Inducement Study

2.1.1 Overview

This study addresses two issues. The primary issue is whether the improved or enhanced accessibility (accessibility reflects both the attractiveness of potential destinations and ease of reaching them) provided by the project would increase residential growth beyond what is planned for the areas of Santa Cruz County or northern Monterey County or whether it will merely support planned growth. The second issue of concern is the sensitivity of environmental resources to unplanned growth. This growth inducement study addresses these issues by investigating the potential for unplanned growth due to the project. In addressing these issues, the study answers the three sets of questions presented on page 1.

Most land use changes in California are not direct consequences of a highway project, but rather occur indirectly due to changes in travel time and increased land accessibility in areas that may be ripe for development. Some highway widening projects are specifically designed to facilitate planned land use changes and development, although this is not the purpose of the proposed projects to improve Highway 1.

Population, economic growth, desirability of certain locations, the costs and availability of developable land, physical and regulatory constraints, transportation, and the costs of sewer and water services all strongly influence where when and what type of development takes place. This growth inducement analysis concentrates mainly on residential growth. The potential impacts on commercial growth are considered qualitatively as a subsequent step.

There are a number of factors that affect the residential growth in a community. In addition to the factors mentioned above, these include prices and availability of housing, accessibility to jobs, local plans for the region, amenities available in the region, such as good schools, and availability of adequate infrastructure to support the needs of residential development. This study will consider all of these factors, but will focus its quantitative efforts on accessibility, since the two major build alternatives (TSM Alternative and the HOV Lane Alternative) could have a direct effect on accessibility. Based on the analysis of the accessibility effect of the HOV Lane project, the study also estimates the potential effect of the more subtle accessibility changes caused by the Soquel to Morrissey Auxiliary Lanes project.

2.1.2 Background

Constructed in the 1930s as a four-lane highway, traffic on the Highway 1 corridor through Santa Cruz and Monterey Counties has increased considerably over the past 20 years. The corridor is the major transportation route for the residents of Santa Cruz and Monterey counties and is an important

link in the regional transportation system. Traffic on Highway 1 is affected by a pronounced commute pattern between housing in southern Santa Cruz County to jobs in the Santa Cruz area and farther north in Silicon Valley. The increased demand for workers in the Santa Cruz area in addition to the commute trips to Silicon Valley is expected to increase recurrent peak-period highway delay in the project area.

Caltrans, in partnership with the SCCRTC, has analyzed options to address the increasing traffic congestion along the proposed project corridor. The construction of HOV Lanes proposes to reduce traffic congestion by encouraging carpools, improving express bus services and improving safety. A *Transit Market Analysis Study* (2007) found that a dedicated lane for buses and other high-occupancy vehicles would allow Highway 17 Express Bus Service continue services to the Soquel park-and-ride station while supporting the proposed expansion to State Park interchange; increasing congestion would otherwise likely cause Metro to remove the express bus service from Highway 1. These dedicated lanes would also help to improve the transit ridership of other express buses in the corridor.

2.2 Study Methodology

This study uses an analytical methodology to assess the growth inducement potential of the project. The analytical approach consists of a quantitative model to analyze the effects of commuter time savings between residential and employment locations. The steps included in the methodology are outlined below.

2.2.1 Step 1 – Selection of Analysis Areas

The analysis areas to review for changes in growth potential are selected in this step. General plans for the cities near the project area are reviewed. These plans show the intensity and distribution of different land uses planned for the cities. Based on these plans and the growth factors described in Step 2, the four areas that could be affected by the proposed Highway 1 HOV Lane Widening Project are identified. The residential growth of these four areas, termed residential zones, is analyzed in the subsequent steps. Each residential zone is represented by a residential centroid, which is simply a point on the map that represents the effective center of the zone. Chapter 3 discusses these residential zones in further detail. See Figure 3 below for the location of the residential centroids.

This study groups the major employment areas in the Bay Area, Santa Clara County, Santa Cruz County and Monterey County into different zones. Nine zones have been selected in total to represent the jobs within and outside the project region. Of the nine zones, three zones represent the employment centers closest to the project area and vicinity. The six other employment zones represent the jobs in the rest of the region. Each of the nine employment areas are represented by an employment centroid, a point on the map that represents the effective center of the zone. See Figure 4 below for the location of employment centroids.

2.2.2 Step 2 – Development of Data on Growth Factors

This step involves the review of growth factors supporting or inhibiting residential growth in the corridor as well as an analysis of current growth trends. These factors, reviewed in Chapter 3, include cost of housing, local government plans and policies and commute time and access. Defining the

amount of growth planned within the corridor and within the analysis zones in particular is important during this step.

A key part of this step is the definition of the location of jobs in the region with the assistance of population and employment forecast data prepared by the Association of Monterey Bay Area Governments (AMBAG). Their *Population, Housing Unit and Employment Forecasts (2004)* are the basis of the population and employment information used in this study. Their *Area Regional Forecast adopted on June 11, 2008* was under development when this analysis was completed. Overall, the 2008 forecast anticipates less population and employment growth than the 2004 forecast did, hence this growth inducement analysis using 2004 forecast can be considered as a worst case analysis.

2.2.3 Step 3 – Growth Model Analysis

This step consists of a detailed analytical assessment of the impact of the three transportation alternatives on growth pressures. The primary factors that affect the growth in a suburban community are the housing prices, local plans and the commute time to employment areas. Commute time is the factor most directly affected by transportation projects. In Step 3, a model is developed to analyze commute time between jobs within and outside the region (represented by the employment centroids) and the four selected residential zones (represented by the residential centroids). Commute times between the job locations and these growth zones is estimated for all the three alternatives under consideration for the horizon year 2035. In this step, a generic peak is considered, representing both morning and evening peaks. The 2035 peak hour commute times are shown in Appendix A.

In the discussion of growth inducement in Chapter 4, an ‘unconstrained analysis’ refers to calculation of residential growth pressures without regard to the planned population capacity of the residential area. In this type of analysis, only accessibility to jobs is considered. A constrained analysis refers to calculations of residential growth pressures analytically constrained by the planned population capacity of the residential area under consideration. The unconstrained and constrained analyses were extrapolated to year 2035, using the *AMBAG Population, Housing Unit and Employment Forecasts 2004* series, to comply with FHWA requirements of considering traffic conditions 20 years past the opening year.

Using the data discussed above, three indices are calculated for each residential zone:

1. The unconstrained residential growth pressure index, which is proportional to the jobs accessed from a zone and inversely proportional to the square of the access time during the peak hour, which is the average of AM and PM peak-hour conditions. This index demonstrates the growth pressure or relative growth that might be caused by just access to jobs.
2. The planned residential growth pressure index is simply the growth planned for the individual residential area under consideration, divided by the total residential growth planned within the selected growth areas, expressed as a percentage.
3. The constrained residential growth pressure index, which is proportional to the jobs accessed from a zone times the planned population growth capacity of the zone and inversely

proportional to the square of the access time during the generic peak. This index combines the effects of community plans for growth with the effects of access to jobs.

2.2.4 Step 4 – Overall Growth Inducement Assessment

The changes in growth pressure generated by changes in peak-hour travel times, as defined by the indices developed in the earlier steps are reviewed along with other qualitative growth-factors to arrive at an overall assessment. The growth pressures affected by changes in peak-hour travel times, as defined by the indices, are reviewed along with the other, more qualitative factors listed above. Growth inducing factors related to support services for new housing, e.g., retail, commercial, and medical, are also considered qualitatively. In this step, the results for draft review as well as for input to the expert panel (Chapters 4 and 6) are documented.

2.2.5 Step 5 – Expert Panel

In Step 5, we convene an expert panel of local planners, representatives of real estate developers and local colleges to review the above results and give their assessment of the likely growth inducement effects of the projects. An expert panel provides a measure of validation not possible with analyses alone. We have found that the quantitative results of the growth inducement model to be extremely valuable in focusing discussion and helping place travel time in context with other factors affecting development, factors with which the expert panel is typically most familiar. Following expert panel review, we integrate the panel's findings into the study results and produce a final report.

Chapter 3 **Description of the Study Area**

3.1 Overview

This section addresses the main issue of concern: the potential for unplanned growth due to the project. This is done by looking primarily at the effect of the proposed project on accessibility to jobs from the residential areas and the effect of the local plans of these areas. Secondary factors observed include housing prices, infrastructure and amenities available in the region. Growth inducement effects extend beyond the facility being improved. Therefore, communities near the project area that have room for growth are also examined.

The following sections discuss the selection of residential growth areas for analysis, area land use and plans that form the planning context for this study, and population and employment forecasts for the region.

3.2 Zones and Centroids

All through this report there is discussion of zones and centroids. A zone is just an area selected for study. For example, Aptos, Watsonville, Castroville and Fort Ord are the residential zones/centroids selected for this study. The employment zones/centroids selected include different cities in the Bay Area and the counties of Santa Clara, Santa Cruz and Monterey as discussed in Chapter 3. For the ease of determining the travel time from an employment zone to a residential zone, each zone is represented by a focal point or centroid. For modeling purposes, a centroid is a point in the zone from which traffic generated by the zone can be connected to the surrounding roadway system. This study defines an employment centroid as a focal point that represents the center of activity of an employment zone. A residential centroid also represents the central point in a zone. At times, sensitive areas, such as areas shown in a city's general plan as slated for low density development, are chosen as centroids of residential zones. In addition to providing an idea about the growth inducement effects on the entire zone, such centroids also accurately show the effect on that small sensitive area due to growth inducement.

3.3 Selection of Potential Growth Areas

Four residential areas/centroids were selected to be analyzed for comparative growth inducement effect of the Highway 1 HOV Lane Widening Project based on the following considerations:

1. Proximity to the Highway 1 corridor;
2. A reasonable range of commute times that would be affected by the proposed project; and
3. Potential for future growth per AMBAG projections with a project build out population of a several thousand or more

Figure 3 depicts the location of these areas, which represent two communities in Santa Cruz County and two communities in northern Monterey County. The four residential areas/centroids are as follows:

R-1: Aptos

R-2: North Watsonville

R-3: Castroville

R-4: Fort Ord

The above selected growth areas are a sampling of the sub-regions that might be influenced by the Highway 1 HOV Lane Widening Project alternatives. They are not meant to capture all the growth expected in Santa Cruz and Monterey counties but rather to illustrate the potential residential growth inducement impact of the transportation alternatives.

Northern part of Watsonville was selected as a residential zone since it had the most potential for growth according to AMBAG projections. Also, this region is closer to the project area and is therefore more sensitive to changes in accessibility.

Figure 3: Location of Residential Analysis Zones or Centroids (R-1 to R-4)



Table 1 shows the population projections for these four residential areas for years 2000 and 2030 (AMBAG *Population, Housing Unit and Employment Forecasts, 2004*). Aptos (R-1) and North Watsonville (R-2) together are projected to make up approximately 3.4 percent of the total projected population of Santa Cruz County for 2030. Castroville (R-3) and Fort Ord (R-4) are expected to total approximately 2.3 percent of the Monterey County population in 2030. North Watsonville (R-2) and Fort Ord (R-4) will experience the largest increases in population from 2000 to 2030, with an increase of 111 percent and 2,699 percent respectively. This increase in population will correspond with increases in demand for housing in these areas, specifically Monterey County with a projected population increase of 50 percent from 2000 to 2030.

Table 1: City and County Population and Growth Projections					
Region	Population			Increase in Population (2000-2030)	% Increase in Population (2000-2030)
	2000	2030	% of 2030 County Population		
Aptos	4,749	5,490	2%	741	16%
North Watsonville	1,956	4,129	1.4%	2173	111%
Santa Cruz County	255,602	304,847	100%	49,245	19%
Castroville	6,195	8,265	1.4%	2070	33%
Fort Ord	196	5,487	0.9%	5291	2699%
Monterey County	401,762	602,731	100%	200,969	50%
Source : AMBAG <i>Population, Housing Unit and Employment Forecasts, 2004</i>					
Note: Overall, the AMBAG 2008 <i>Regional Forecast</i> anticipates less population and employment growth than the 2004 forecast did, hence this growth inducement analysis using <i>Population, Housing Unit and Employment Forecasts 2004</i> can be considered as a worst case analysis.					

3.4 Selection of Employment Zones

The analytical growth model uses access to jobs as a prime variable. This study groups the major employment areas into nine zones, with three zones in Santa Cruz County, three zones in Monterey County, and three zones in the Bay Area (one zone in San Jose, one zone in San Mateo and one zone in the East Bay). Each employment zone is represented by an employment centroid. For this study, an employment centroid is defined as a focal point that represents the center of activity of an employment zone. Figure 4 shows the location of these employment concentrations used in the growth model. The three centroids in Santa Cruz County, E-1 through E-3, denote the employment in the Highway 1 HOV Lane Widening Project area and vicinity. The remaining six employment centroids (E-4 through E-9) denote the employment in areas outside of the project vicinity.

Figure 4: Location of Employment Zones or Centroids (E-1 to E-9)

The nine employment zones, represented by centroids, E-1 to E-9, were selected by grouping together cities or counties. Cities in the Highway 1 corridor are also typically grouped with unincorporated areas adjacent to them. Table 2 summarizes the employment growth rates of the zones (E-1-E-9). The Salinas (E-5) and Castroville (E-6) zones are projected to have the largest percentage increase in employment between 2000 and 2030 with a 48% increase for both employment zones. In contrast, the

employment centroids (E1-E3) located in Santa Cruz County will experience an average increase of 43% between 2000 and 2030. In addition, the three centroids (E-1 – E-3) located in Santa Cruz County will account for approximately six percent (6%) of the total 2030 projected growth in the combined Monterey Bay and San Francisco Bay areas. The Bay Area zones will have the largest absolute increases.

Table 2: Employment Distribution and Growth among Centroids						
Employment Zones or Centroids		2000	%	2030	%	Change 2000 - 2030
E-1	Santa Cruz	70,000	3%	100,000	3%	30,000 43%
E-2	Scotts Valley	13,000	0.5%	18,000	0.5%	5,000 38%
E-3	Watsonville	44,000	2%	63,000	2%	19,000 43%
E-4	Seaside	83,000	3%	120,000	3%	37,000 45%
E-5	Salinas	82,000	3%	121,000	3%	39,000 48%
E-6	Castroville	1,157	0.04%	1,715	0.05%	558 48%
E-7	San Jose	1,044,130	39%	1,339,970	38%	295,840 28%
E-8	San Mateo	1,029,090	39%	1,336,180	38%	307,090 30%
E-9	East Bay	289,990	11%	422,090	12%	132,100 46%
Total Employment Centroids		2,658,367	100%	3,523,985	100%	865,618 33%
Source: AMBAG Population, Housing Unit and Employment Forecasts 2004 and ABAG Projections 2005						
Note: Overall, the AMBAG 2008 Regional Forecast anticipates less population and employment growth than the 2004 forecast did, hence this growth inducement analysis using <i>Population, Housing Unit and Employment Forecasts 2004</i> can be considered as a worst case analysis.						

3.5 Area Land Use and Plans

There is opportunity for limited growth in several communities near the Highway 1 HOV Lane Widening project corridor. The planned development for these areas is described in each city's general plan and is discussed in this chapter. General plans for Santa Cruz County, City of Santa Cruz, City of Capitola, City of Watsonville, Monterey County and the City of Marina are reviewed in this section. Local and regional planners were also contacted to determine development trends and sensitive areas in Santa Cruz County, as well as the surrounding areas in Monterey County. The

following subsections discuss the growth related plans of Santa Cruz and Monterey counties and the four sample growth areas selected for the analysis within them.

3.5.1 Santa Cruz County

In 2005, the County of Santa Cruz's population was estimated at 267,544 and it is projected to increase to 304,847 by 2030⁵ The Santa Cruz County 1994 General Plan and Local Coastal Program recognizes the potential future loss of highly productive agricultural lands and scenic resources due to rapid urbanization. The general plan outlines a number of land uses, agricultural and circulation goals for the county which emphasizes infill development, affordable housing, preservation of agricultural land and environmental quality.

The county's land use goals, as they relate to growth, include the provision of functional and balanced urban, rural, and agricultural land uses that maintain environmental quality; enhances economic vitality; protects the public health, safety and welfare; and preserves the quality of life in the unincorporated areas of the County. The county is aiming to provide adequate industrial and commercial facilities to meet the shopping, service and employment needs of its residents and visitors. The county is also attempting to develop an efficient land use pattern which improves the area's jobs/housing balance and thereby reduces the total amount of vehicle miles traveled and reduces polluting emissions. These goals are challenged by the need to provide adequate services.

Specific land use policies that restrict growth include the county's policy to locate new residential, commercial, or industrial development within or in close proximity to existing developed areas with adequate public services that will not have substantial adverse effects on environmental and natural resources. The county also adopts a policy that emphasizes maintenance of urban and rural growth rates portions of the County by encouraging residential development to locate within existing urban areas where adequate levels of public services exist and discourage new development in urban and rural areas, where such public services are not available and environmental resource impacts cannot be mitigated. As continued growth is projected, local growth policies will have to balance the needs of both urban and rural (agricultural) uses to preserve the region's character and productivity.

3.5.1.1 City of Santa Cruz

The current population of the city is about 56,000 persons, which is projected to increase to 63, 987 in 2030.⁶ The 2030 population total may be overestimated due to decreases in the projected student population for the University of Santa Cruz in 2030.⁷ The city's primary goals include economic development, environmental preservation and redevelopment. The city is advocating for slow and modest growth through strategies such as redevelopment of existing properties and infill development. The city's development is restricted by the amount of available land due to the fact that there are almost no agricultural lands and the city is approximately 98 percent built out. Presently,

⁵ Association of Monterey Bay Area Governments, *2004 AMBAG Population, Housing Unit and Employment Forecasts* (2004).

⁶ Association of Monterey Bay Area Governments, *supra*

⁷ Association of Monterey Bay Area Governments, *supra*.

there is limited vacant land and there is not enough affordable housing in the city due to cost of housing and shortage of units.

The General Plan/Local Coastal Program for the City of Santa Cruz, currently under revision, includes policies and guidelines for land use for the city of Santa Cruz. The General Plan regulates further residential, commercial and industrial development to existing boundaries. The City reinforces this urban development policy through the preservation of the Pacific Ocean, agricultural/grazing lands, publicly-owned open space, and natural areas. Transportation goals also focus on containing urban development within the city by encouraging alternative modes of transportation, increasing the average number of persons per automobile and maximizing the efficiency of the existing road system without expanding it unnecessarily.

3.5.1.2 City of Capitola

The City of Capitola's population in 2005 was approximately 10,869 persons, which is projected to increase to 11,136 in 2030.⁸ The Housing Element of the City of Capitola's General Plan, adopted in 2004, does not anticipate a substantial amount of population or household growth. It is expected that any population growth would be absorbed into existing households and housing units. There are very few vacant parcels and limited agricultural lands within the city limits, so future development would be confined to scattered infill development and intensification of existing uses. This is consistent with Capitola residents desire to maintain the city's small town environment.

One of the city's goals is to allow higher density residential development to encourage more affordable housing and improve public transportation to support higher density developments. The city is in the process of developing new growth plans that will provide attractive incentives to developers and home owners in order to encourage higher density development.

3.5.1.3 City of Watsonville

In 2005, the estimated population for the City of Watsonville was 52,716 and it is projected to increase to approximately 70,418.⁹ The City of Watsonville is largely built out and will rely and adding unincorporated land within its sphere of influence to grow. The city supports growth policies and has recently witnessed substantial residential and commercial growth. One of the city's primary goals is to annex adjacent northern and eastern areas over the next 20 years to allow for residential and industrial development. The city is also focusing on infill development and redevelopment. The city has restricted development in riparian areas that are categorized as "sensitive lands" and coastal zones. Approximately 18 percent¹⁰ of employment is related to agriculture, and the city plays an important role in providing affordable housing.

The City of Watsonville 2005 General Plan emphasizes the goal of maintaining compact development to promote city unification and clear demarcation between rural and urban uses. The City has adopted a specific policy toward city-centered development/urban development that promotes infill within existing city limits. The city also requires that annexation of undeveloped and underdeveloped land

⁸ Association of Monterey Bay Area Governments, *supra* note 3.

⁹ Association of Monterey Bay Area Governments, *supra*.

¹⁰ U.S. Census Bureau, *American Factfinder for Watsonville, California* (2000) available at http://www.centralcoastdata.org/public_html/census/index.htm

must occur in phases to allow efficient expansion of urban infrastructure and promote development of lands within existing urban areas first. These policies assist the city in containing urban development within specific boundaries to achieve its goal of compact development and provision of affordable housing.

3.5.2 Monterey County

The 2005 population for Monterey County was approximately 425,574 and it is expected to increase to 602,732 in 2030.¹¹ Monterey County's population is expected to increase by approximately 35% from 2000 to 2020.¹² The County will experience that largest growth of residential and commercial development in the Fort Ord Area and the cities of Marina and Salinas. A majority of the county's residents is opposed to growth. In addition, there are growth limitations due to the presence of visual resources, non-availability of water, and restrictions on farmland development. The public opposition to growth and the development restriction create a contraction for the county due to its desperate need for housing. Monterey County is also challenged by infrastructure deficiencies, specifically is surrounding highway including Highway 1 and Highway 156.

Monterey County's 2006 General Plan Update focuses on creating a general framework that encourages growth within or near developed/developing areas in order to reduce impacts to agricultural production, natural resources and public services. The general plan encourages development in incorporated cities and designated community areas where existing services, water, sewage and transportation facilities, are available. The general plan also implements policies to minimize the acquisition of land for roadway construction and encourages carpooling. The plan emphasizes the viability of public transportation to encourage higher density residential development.

3.5.2.1 Fort Ord

Fort Ord is the expected to experience the largest increases in population, with an expected 187% increase from its 2000 population of 12,979 to an estimated 2020 population of 37,370 persons.¹³ Fort Ord was a U.S. Army post on Monterey Bay but most of its land has been absorbed into the cities of Marina, Del Rey Oaks, Seaside, Salinas and Spreckels. Fort Ord has been a major focal point for residential and commercial development. The Fort Ord Master Plan's, which is part of the Monterey County Master Plan, primary goal is to promote orderly, well-planned, and balanced development to ensure educational, housing and economic opportunities as well as environmental protection. The plan emphasizes the preservation of natural landscapes while encouraging mixed used development with village focal points.

¹¹ Association of Monterey Bay Area Governments, *supra* note 5.

¹² Association of Monterey Bay Area Governments, *supra*.

¹³ County of Monterey, *The Fort Ord Area Master Plan*, located in 2006 Monterey County General Plan Update (October 2006). AMBAG TAZ data were used to define the Fort Ord growth area, which showed very few residents in the central Fort Ord area in 2000 and, resultantly, a much higher growth percentage to 2030.

3.5.2.2 Castroville

In 2000, the population was approximately 6,195 persons.¹⁴ The community's population is expected to increase to approximately 8,265 in 2030, which may be an underestimate given the city's future development plans. Monterey County adopted the Castroville Community Plan in 2007. The community plan serves as a comprehensive planning document to guide future growth and redevelopment activities for the next 20 years. The plan focuses on smart growth strategies, such as infill development, to provide the community with new housing opportunities, improved living conditions and new public facilities. The community plan proposes construction of 1,600 new dwelling units and approximately 130 acres of new industrial park.¹⁵

3.5.2.3 City of Marina

The City of Marina's population in 2005 totaled approximately 23,772 persons, which is projected to increase to 35,357.¹⁶ Over the next 15 years, Marina is expected to experience substantial growth. The City of Marina General Plan incorporates plans for residential and commercial developments while restricting development on the 300 acres of land along the coast for the next 20 years. Most of the city's goals and policies are aimed at providing an adequate network of accessible and attractive parks, open space, greenbelts, trails and other recreational facilities to meet the needs of Marina's residents.

Many of the city's development efforts are focused on the development of the Fort Ord area for civilian use. The University Village project will be built in the Fort Ord area and it proposes 1,237 residential units.¹⁷ This project is in addition to the Marina Heights project that proposes development of 1050 residential units. There is also a new suburban development on the 2,000 acre Armstrong Ranch, which is located along Highway 1 between the current city limits and the Salinas River. The size of this development has been the focus of debate and controversy. There is also development planned for the Marina station, which would include a mix of commercial, residential and industrial land uses with approximately 1,300 proposed residential units; new resorts and hotels.¹⁸ The city plans to redevelop the Central Marina as part of a downtown revitalization. The California State University at Monterey Bay has plans to develop its north campus by constructing about 494 housing units¹⁹.

3.6 Housing Prices and Vacancy Rates

Housing prices in California are higher than the national averages; according to 2000 U.S. Census data the median value for owner occupied homes in the United States was \$111,800.00 versus California's median value of \$198,900.²⁰ Housing prices are relatively higher in the counties of Santa

¹⁴ Association of Monterey Bay Area Governments, *supra*.

¹⁵ County of Monterey, *Castroville Community Plan* (December 2004) *updated* (March, 2007).

¹⁶ Association of Monterey Bay Area Governments, *supra* note 5.

¹⁷ City of Marina, *City of Marina General Plan* (October 2000).

¹⁸ City of Marina, *supra*.

¹⁹ City of Marina, *supra*.

²⁰ U.S. Census Bureau, *supra* note 7.

Cruz and Monterey. Recent trends indicate that a growing segment of the population is unable to afford the traditional single-family home on a separate lot.

The County of Santa Cruz and its communities continue to face common challenges in providing an adequate supply and affordable housing opportunities. Due to the limited supply of remaining residentially zoned vacant land, housing production in the counties of Santa Cruz and Monterey will continue to focus on already urbanized areas, particularly as infill development. The cities of Santa Cruz, Capitola and Watsonville have adopted specific policies in their general plans to encourage infill development and redevelopment. The City of Marina and areas of Monterey County, such as Fort Ord and Castroville, also have plans for major residential projects. These residential development patterns will encourage a residential population growth to specific areas of Monterey County while most jobs will remain in the City of Santa Cruz and Silicon Valley.

Housing cost plays a major role in people's choice of residential location. Affordable housing opportunities can influence commuters to travel long distances to work. Median prices for single family homes, condos and town houses in the study area are shown in Table 3. The table demonstrates that housing prices are notably higher in Santa Cruz County than Monterey County, where the median household value is \$353,300 in Santa Cruz County and \$254,800 in Monterey County. These values are based on 2000 U.S. Census data; therefore in terms of 2007 dollars these values are higher. The June 2007 median price for single family homes was \$757,000 in Santa Cruz County, \$849,000 in the City of Santa Cruz, approximately \$950,000 in Aptos and Capitola, and \$600,000 in Watsonville. Median prices were somewhat lower in adjacent Monterey County: \$717,000 in Monterey County and \$577,500 in Marina.²¹ Of the four residential centroids selected for this study, Castroville has the lowest median household value (\$174,100) and median gross monthly rent of \$688. The more affordable housing in Monterey County and southern Santa Cruz County encourages south to north commute to employment centers of Santa Cruz and Silicon Valley, and creates additional pressure on the transportation infrastructure, such as Highway 1.

In addition to housing prices, housing vacancy rates is also an important factor affecting residential growth. Vacancy rates for the study area are presented in Table 4 below. The vacancy rate is defined as the percentage of total unoccupied housing units that are either for sale or for rent. The California Department of Housing and Community Development (HCD) finds that a vacancy rate of five percent is needed to allow adequate mobility within the housing market. According to 2000 U.S. Census Data, only approximately 7.8 percent of housing units within Santa Cruz County and 8 percent within Monterey County were vacant and available for sale or rent. These Census figures do not correspond well to experience or locally observed data for Santa Cruz County, which indicate much lower vacancy rates. For example, the local real estate report indicates a 2001 overall vacancy rate of 4.9 percent but half of this is for seasonal, recreational, or occasional use; the vacancy rates were 1.4 percent for rental units and 0.7 percent for homeowners in the City of Santa Cruz.²² Additionally, the City of Santa Cruz General Plan states that the city is challenged by housing shortages.

²¹ <http://rereport.com/szc/main2.html>, <http://www.rereport.com/mtv/main2.html>

²² http://www.santacruzrealestate.biz/cities/santa_cruz/index.htm

The combination of high home and rental prices, and low vacancy rates promote housing shortages in communities like the City of Santa Cruz and maintain existing demands on existing transportation corridors. This combination also increases growth pressures throughout the corridor by generating substantial unmet demand for affordable housing that is accessible to jobs. The addition of new residential development in Watsonville and Monterey County will result in longer commutes to employment centers/centroids in Santa Cruz County, which will add additional pressure to the existing transportation corridors, including Highway 1.

Table 3: Median Household Home Values, Rental Prices and Occupation Rates for the Study Area

Geographic Area	Median Household Value (2000\$)	Median Gross Rent	Owner Occupied		Renter Occupied	
Santa Cruz County	\$353,300	\$924	54,681	55%	36,458	37%
Aptos	\$370,700	\$1,091	2,741	62%	1,314	30%
Watsonville*	\$224,700	\$742	5,476	47%	5,905	50%
Monterey County	\$254,800	\$776	66,213	50%	55,023	42%
Castroville	\$174,100	\$688	647	45%	787	54%
Fort Ord**	N/A	N/A	N/A	N/A	N/A	N/A

Source: 2000 U.S. Census Data, available at <http://factfinder.census.gov>
 *Data not available for North Watsonville, the totals listed are based on Watsonville 2000 Census Data.
 **Data not available for Fort Ord.

Table 4: Vacancy Rates in the Study Area

Housing Units and Occupancy Status	Santa Cruz County	Aptos	North Watsonville*	Monterey County	Castroville	Fort Ord**
Housing Units	98,873	4,450	11,771	131,708	1,446	N/A
Vacant Units	7,734	420	328	10,472	28	N/A
% Vacant	7.8%	9.4%	2.8%	8.0%	1.9%	N/A

Source: 2000 U.S. Census Data, available at <http://factfinder.census.gov>
 *Housing Units and Vacancy rates were not available for North Watsonville; the totals listed are based on Watsonville 2000 Census Data.
 **Housing units were not available for Fort Ord.

Chapter 4 of this report examines the effects of the proposed project on the accessibility dimension of the housing growth pressures, but it is important to realize that the growth pressures are substantial with or without the proposed project. The cities and counties in the study area have developed growth policies to control substantial growth pressures in their communities. As described above, all of the potential growth areas chosen for analysis have restrictive growth policies to limit growth to levels considered reasonable by the respective communities.

Chapter 4 **Growth Model Results**

4.1 Introduction

Commute time is the factor that would be most directly affected by the Highway 1 HOV Lane Widening Project. This chapter describes the model created to analyze commute time between the centroids representing the four selected growth areas (Section 3.3) and the nine employment centroids (Section 3.4) in the study area. The analysis addresses the No-Build Alternative and the two build alternatives: TSM Build Alternative and HOV Build Alternative (See Section 1.3.2 for discussion on the alternatives). The next chapter discusses the results of the expert panel. The last chapter of the report assesses the overall growth inducement effects, considering the model analysis and the data from the previous chapters, and presents the conclusions of the study.

4.2 Commute Time and Time Savings

4.2.1 Peak-Hour Commute Times

Peak-hour commute times between the employment centroids and the residential growth areas were estimated for all alternatives under consideration for the horizon year of 2035. Table A-1 of Appendix A reports travel times, which are based on estimates developed by this study. Freeway speeds of 35 mph (56 kph) were used to determine peak-hour commute times for freeways outside of the immediate project area. This standard speed on freeways (other than Highway 1) is a constant under all three alternatives and hence does not affect the result of the analysis. A sensitivity check was also performed assuming 45 mph (72 kph); it produced similar results. Given the level of population growth anticipated in the future and the level of freeway improvements planned in the region, we do not anticipate the average freeway speed to be greater than 35 to 45 mph during peak hours in 2035. Commute times within the project limits were based on projected vehicle delays for the alternatives presented in the traffic operations analysis reports.

4.2.2 Time Savings

Under 2035 No-Build conditions, delays between Larkin Valley Road and Highway 17 and vicinity would vary between 19 minutes to 49 minutes depending on the direction and the peak hour (morning or evening peak) for both High Occupancy Vehicle (HOV) lane eligible users and mixed-flow lane users. As shown in Table 5, the HOV Build Alternative would eliminate delays for HOV lane users in both directions and peak hours, except for a one minute delay in the evening peak hour in the northbound direction. The HOV Build Alternative would result in a delay time savings between 19 to 49 minutes for HOV Lanes, whereas the HOV Build Alternative would save mixed flow lane users delay times between 17 and 40 minutes.

**Table 5: Projected 2035 Delay within the Project Limits
under the No-Build and Build Alternatives (minutes)**

Alternative	Lane Type	Southbound AM		Southbound PM		Northbound AM		Northbound PM	
		No-Build	Build	No-Build	Build	No-Build	Build	No-Build	Build
HOV Build	Mixed-Flow	19	2	49	12	48	8	25	6
	HOV	19	0	49	0	48	0	25	1
TSM Build	Mixed-Flow	19	2	49	50	48	22	25	19

Source: *Highway 1 HOV Lane Widening Project – Traffic Operations Report*, Wilbur Smith Associates, April 2007

The TSM Alternative does not provide HOV lanes and hence both High-Occupancy Vehicles and Single-Occupancy Vehicles are subjected to similar traffic conditions. As shown in Table 5, this alternative leads to a reduction in delay, except in the southbound direction in the evening peak hour. The southbound pm direction, under the TSM Build Alternative, will result in a one minute increase in delay time from 49 minutes to 50 minutes. Although overall freeway operations would improve with ramp metering, the additional traffic along with the already-congested conditions in the southbound direction during the evening peak hour (under no-build conditions), would cause traffic operations in the corridor to worsen slightly (by a minute).

In all other directions, the TSM Build Alternative will result in a 6 to 26 minutes delay time savings. For a growth inducement analysis, the delay and travel time for all users, both HOV lanes and mixed-flow users, should be considered. Hence, an overall travel time, travel time weighted by the mixed-flow and HOV traffic demand was considered for this study. In this report, ‘travel time’ will refer to the overall travel time. In addition, the travel time savings represent the average commute time savings to and from work.

Compared with 2035 No-Build conditions, projected average travel time savings between residential zones and employment centroids that would be obtained by the Highway 1 HOV Lane Widening Project would vary depending on the location of the residential zone and the alternative. The residential areas of Aptos and Watsonville (R-1 and R-2) would realize the maximum travel time savings cumulatively for both build alternatives. Under the HOV Build Alternative, the maximum travel time savings of approximately 33 to 34 minutes would be obtained by residents of Watsonville (residential zone R-2), commuting to or from employment zones in Santa Cruz, Scotts Valley, San Jose, San Mateo and East Bay (E-1, E-2 and E-7 to E-9). See Table A-2 in Appendix A, for detailed travel time savings information. The residents of Aptos (R-1) would experience the most consistent time savings for every employment zone (E-1 to E-9), ranging from approximately five to 24 minutes. Note that these time savings are slightly higher than the delay savings in Table 5 because the queues in the project area would extend all the way to Watsonville by 2035, causing additional delay outside the project area.

The maximum travel time savings under the TSM Build Alternative would be for the residential area of Watsonville (R-2). A time savings of approximately 12 minutes would result in commutes to and from employment zones in Santa Cruz, Scotts Valley, San Jose, San Mateo and East Bay (E-1, E-2

and E-7 to E-9). This results in substantially lower travel time savings (21 minutes) from the HOV Build Alternative. The residential zone of Aptos would receive time savings ranging from two to eight minutes to all employment centers (E-1 to E9). The most time savings for both Build Alternatives would be gained from commutes to and from employment centers in Santa Cruz and Scotts Valley (E-1 and E-2). The TSM Build Alternative will provide an eight- to twelve-minutes travel times savings to and from employment centers in Santa Cruz and Scotts Valley, whereas the HOV Build Alternative will result in a 23- to 33-minute time savings from the sample residential areas (R-1 to R-4).

4.3 Terminology

In the following discussion of growth inducement, “unconstrained” refers to calculations of residential growth pressures without regard to the planned population capacity of the area in question. In this type of analysis, only accessibility to jobs is considered. “Constrained” refers to calculations of residential growth pressures analytically constrained by the planned population capacity of the area in question.

Using the data discussed above, we calculate three indices for each residential area:²³

1. The unconstrained residential growth pressure index, is proportional to the jobs accessed from the residential area to an employment zone and inversely proportional to the square of the access time during peak hour (generic peak).
2. The planned residential growth pressure index is the growth planned for the individual residential area under consideration, divided by the total residential growth planned within the selected growth areas, expressed as a percentage. The residential growth planned for the four selected growth areas is given in Table 1.
3. The constrained residential growth pressure index, is proportional to the jobs accessed from a zone times the planned population growth capacity of the zone and inversely proportional to the square of the access time during the generic peak.

The unconstrained growth index gives an idea of the relative growth pressure created by a change in commute travel time from the residential area to the employment zones. With this index, the growth pressure is influenced only by the travel time from the residential zones to the employment zones and the number of jobs in those zones. The constrained growth index shows the combined effect of land use plans and access on the relative growth pressure.

In the growth indices reflecting access to jobs, jobs are weighted by dividing by the square of the access time. Thus closer jobs have a stronger potential effect on growth. The inverse square relationship (gravity model) to time is derived from its success in predicting trip patterns between points in transportation models. In other words, each doubling of travel time really has a quadrupling effect on travel behavior.

²³ Hirschman and Henderson, *supra* note 1.

These indices are relative comparisons among just the four growth analysis areas or zones. Each index sums to 100 percent across the four zones. Hence, by definition, an alternative that increases growth pressures in one or more zones also reduces growth pressures in the remaining zones. This type of index is useful for comparisons among the zones and between the Build and No-Build Alternatives. However, the comparisons are relative, not absolute, and are subject to consideration of other factors related to growth.

4.4 Results

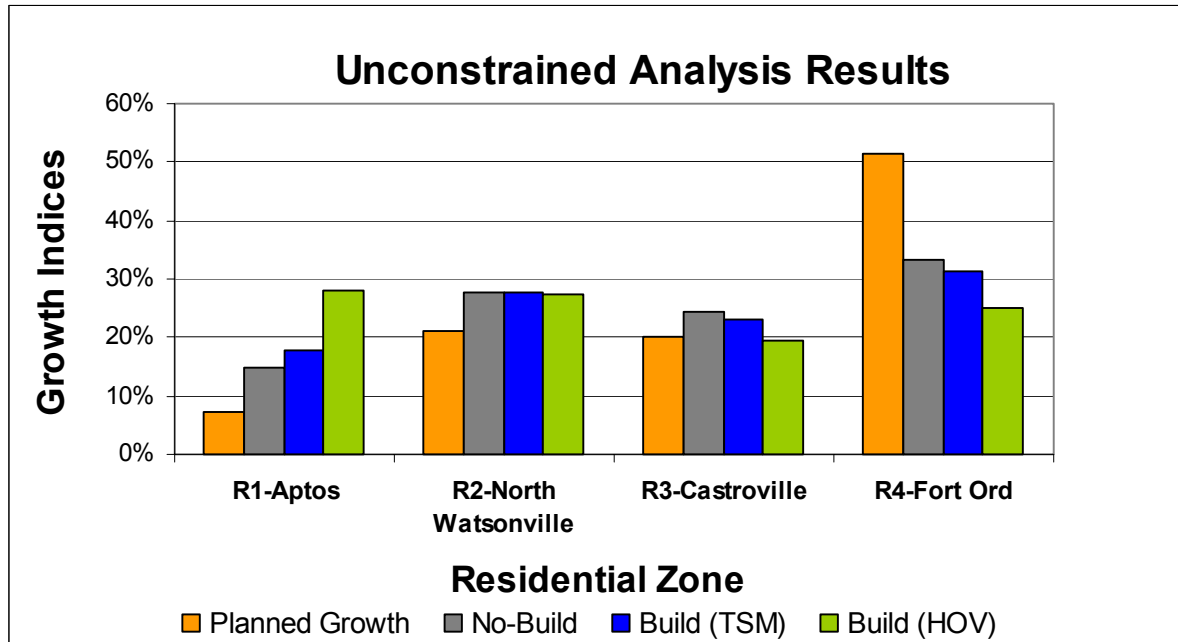
The results of the constrained and unconstrained analyses are given below.

4.4.1 Unconstrained Analyses

The unconstrained growth indices reflect growth pressures due only to access to jobs. Table 6 and Figure 5 summarize the results of the unconstrained analysis. Note that even without the project, the unconstrained growth indices for Aptos (R-1), Watsonville (R-2) and Castroville (R-3), are much higher than the planned population growth proportion. Therefore, even without any of the proposed Highway 1 HOV Lane Widening Project improvements and without consideration of any of the local factors affecting growth, this model indicates that these areas would tend to attract more growth than what is planned by the cities. The fact that these areas are not currently attracting unplanned growth indicates that land use controls are discouraging residential growth in these areas in favor of residential growth in more remote and potentially less expensive communities.

In contrast, the unconstrained growth index for Fort Ord (R-4) is approximately 18 percent lower than its planned population growth. This difference is attributed to the relative remoteness of the zone from the proposed project as contrasted with the other three sample residential zones. Note that this is a relative comparison within a universe of these four residential zones.

Table 6: Growth Indices for Residential Zones					
Growth Index	Alternative	R1-Aptos	R2-North Watsonville	R3-Castroville	R4-Fort Ord
Unconstrained Growth Index	No-Build	14.83%	27.69%	24.27%	33.22%
	Build (TSM)	17.77%	27.75%	23.11%	31.38%
	Build (HOV)	28.13%	27.34%	19.34%	25.19%
Planned Growth		7.21%	21.15%	20.15%	51.49%
Constrained Growth Index	No-Build	3.70%	20.25%	16.91%	59.15%
	Build (TSM)	4.58%	20.99%	16.65%	57.78%
	Build (HOV)	8.22%	23.43%	15.78%	52.56%
Source: Parsons (2007)					

Figure 5: 2035 Unconstrained Analysis Results – No-Build and Build Alternatives

Source: Parsons (2007)

Table 6 compares the unconstrained growth index for No-Build, TSM Build and HOV Build conditions for each residential area. This comparison indicates that relative growth pressures due to travel time savings would be increased by the TSM Build Alternative for Aptos (3 percent) and possibly, North Watsonville (0.1 percent) compared to Castroville and Fort Ord. The relative growth pressures would be increased by the HOV Build Alternative for Aptos only (13 percent) whereas the other residential zones would decline relatively in growth pressure ranging by three to eight percent with Fort Order having the highest decline.

In summary, the TSM and HOV Build Alternatives would increase relative growth pressures slightly in two of the four selected residential areas. However, given the land use controls and the existing level of growth pressures, slight increases in growth pressure are unlikely to have an important effect on actual residential growth.

4.4.2 Constrained Analyses

The constrained growth indices reflect the improved access to jobs and the planned growth capacities in the analysis areas. They show the combined effect of land use plans and access on relative growth pressure. Table 6 and Figure 6 summarize the results of the constrained analysis.

Even without the project, the constrained growth index for Fort Ord (R-4) is projected to be 7.7 percent higher than Fort Ord's share of the planned residential growth in the selected growth areas (Table 6). The constrained growth index for Aptos, North Watsonville and Castroville are lower than

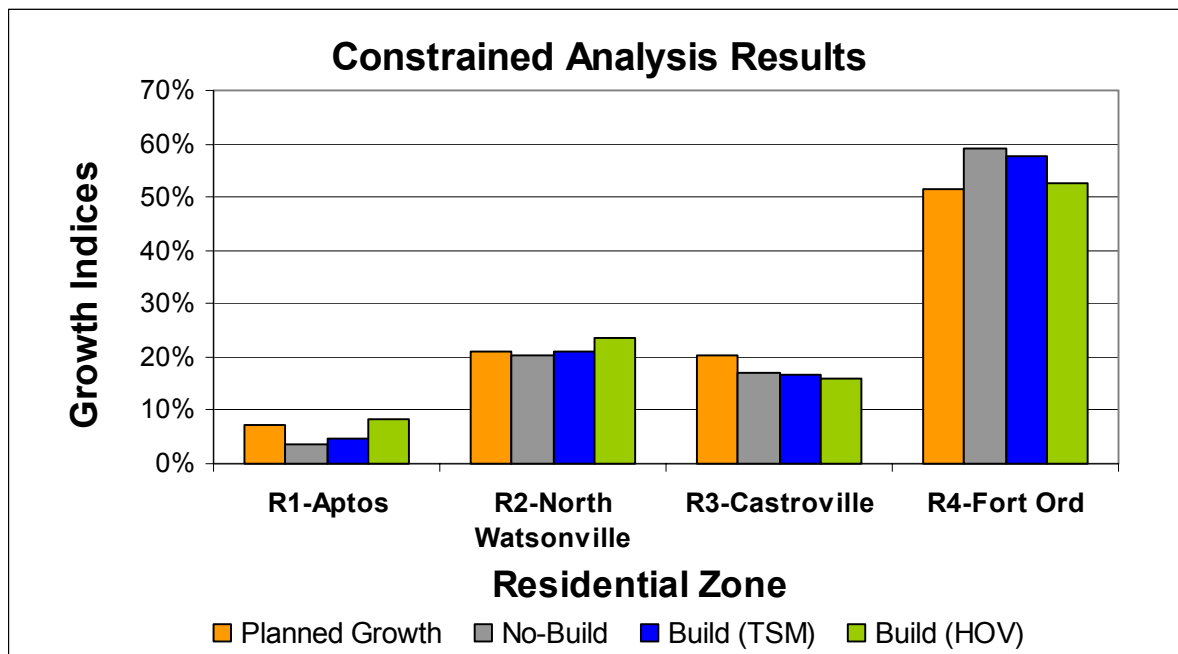
their share of planned residential growth, showing decreases of 3.5 percent, 0.9 percent and 3.2 percent, respectively. The model shows that Fort Ord is assigned a disproportionate share of the growth pressure mostly because of the relatively greater availability of housing among the four zones.

Figure 6 compares the constrained growth index for No-Build, TSM Build and HOV Build conditions for each residential area. The TSM and HOV Build Alternatives demonstrate growth pressure increases due to travel time savings in Aptos and North Watsonville. This comparison indicates that relative growth pressures due to travel time savings would be increased by the TSM Build Alternative for Aptos (0.9 percent) and North Watsonville (0.7 percent). Castroville and Fort Ord would experience a relative decrease in growth pressures under the TSM Build Alternative, .3 percent and 1.4 percent respectively, due to the enhanced attractiveness of the other two communities. The relative growth pressures would be increased by the HOV Build Alternative for Aptos (4.5 percent) and North Watsonville (3.2 percent), whereas there would be a relative growth pressure decline for Castroville (1.1 percent) and Fort Ord (6.6 percent). The relative growth pressures are partially higher for Aptos and North Watsonville under the HOV Build Alternative due to their proximity to employment centers but are constrained by restrictive land use controls and limited residential development as represented by the planned population growth index.

The results of the constrained analysis (Table 6 and Figure 6) are comparable to that of the unconstrained analysis in that they show that when compared to the No-Build Alternative, there would be decreases in growth pressures due to time savings for Castroville and Fort Ord under the TSM and HOV Build Alternatives. Despite its relatively ample residential capacity, Fort Ord in particular will encounter relative decreases in growth pressure for the TSM Build Alternative and the HOV Alternative because its housing is too far away from the project area to be substantially affected by the commute time savings. In summary, the TSM and HOV Build Alternatives would increase relative growth pressures slightly in Aptos and North Watsonville. However, given the land use controls and the existing level of growth pressures, such slight increases in growth pressure are unlikely to have an important effect on actual residential growth. Because access times to jobs from the Aptos and North Watsonville zones have previously been better than those predicted for the future due to increasing Highway 1 congestion, these relative increases in projected growth pressures will actually amount to lower access-related growth pressures than these communities have experienced in the past. This indicates that the politics of growth limitation and the resulting land use controls have been major factors in limiting the amount and rate of growth of these communities. This finding was echoed by the expert panel, as discussed in the next chapter.

4.4.3 Cumulative Considerations

Based on the traffic operations analyses for the HOV Lane and the Auxiliary Lanes projects, the Soquel to Morrissey Auxiliary Lanes Project is estimated to save about nine minutes of delay for peak-hour trips between Larkin Valley Road and Highway 17 in 2035 compared with no-build conditions. This saving compares with a projected increase of 34 minutes of delay between 2003 and 2035. In contrast, the HOV Lane project is forecast to save 13 minutes of delay under the TSM Build Alternative and 41 minutes under the HOV Build Alternative within the same limits.

Figure 6: 2035 Constrained Analysis Results – No-Build and Build Alternatives

Source: Parsons (2007)

On the basis of time savings, the HOV Build Alternative dominates the changes in accessibility. Given the minor time savings estimated for the Auxiliary Lanes project and the conclusion that even the larger time savings the HOV Build Alternative would translate to only minor increases in growth pressures in the corridor, the cumulative growth condition is expected to be the same as predicted for the HOV Build condition.

4.4.4 Summary

Even without the proposed project, the unconstrained growth indices for Aptos, Watsonville and Castroville are higher than the planned population growth pressures. Similarly, the constrained growth indices for Fort Ord are higher than their planned population growth pressures. This shows that even without the project these areas would tend to attract more growth than what is planned by the cities and land use controls are preventing unplanned growth from occurring.

The constrained analysis shows that among the four locations studied, the proposed project would cause a small increase in growth pressures in Aptos (R-1) and North Watsonville (R-2) compared to the other two sample communities. The analyses indicate that the project would not noticeably induce growth pressure in any of the residential areas studied. The TSM Build Alternative would the least effect on residential growth pressures. Considering the high degree of restrictive land use controls in the corridor together with the results of these analyses, the study concludes that there would be no unplanned growth due to the HOV Lane project and, therefore, there would not be growth inducing effects on agricultural lands or other undeveloped areas. There would also be no important effect of the Soquel to Morrissey Auxiliary Lanes Project on the cumulative growth condition.

Chapter 5 **Expert Panel**

5.1 Panel Composition

The expert panel members represented the following entities:

- Santa Cruz Regional Transportation Commission
- Cities of Santa Cruz, Capitola, Watsonville, and Marina
- Counties of Santa Cruz and Monterey
- Community of Castroville
- Hamilton-Swift Land Use & Development Consultants
- University of California, Santa Cruz
- Cabrillo College, Aptos
- LOMAK Property Group, Inc.

The expert panelists attended a conference call on Wednesday, June 27, 2007 to discuss growth impacts from the proposed project. Representatives from city and county planning departments in and near the project area who were invited to participate on the panel did not join in the call but were reached via follow up calls.

5.2 Panel Observations

The panel agreed that the current constraints on land use policy and zoning limit the impact of the Highway 1 HOV Lane Widening Project on unplanned residential or related commercial growth. Fuel costs, zoning restrictions and housing prices have greater impacts on growth than the proposed project. Commercial developers observed commercial and residential demands in the mid-Santa Cruz County area, which would worsen traffic congestion under the No Build Alternative.

There was some concern from panelists that the peak hour impacts, housing and transportation demands may be over estimated. The representative from the University of California, Santa Cruz, noted that the projected student population build-out has decreased, from 21,000 to 19,000, which may result in an over estimation of housing and transportation demands from the university. In a comment that anticipated the changes in the 2008 AMBAG demographic projections, the panel expressed some concern that the numbers of jobs projected for the City of Santa Cruz in the 2004 demographic projections might be higher than what could actually materialize.

5.3 Panel Conclusions

The general consensus was that the project would not stimulate unplanned residential or related commercial growth and it would serve existing growth already planned and projected for the corridor. The lack of developable land in cities, land use plans in the corridor, and public attitudes towards

growth are the major factors preventing unplanned growth. The expert panel agreed that the expansion of the Highway 1 would be insignificant with respect to land use due to supply driven growth, created by the constraints of land use policy and zoning.

Chapter 6 **Overall Assessment and Conclusions**

6.1 Overall Assessment

The main factors that affect the population growth pressures in residential locations like those considered for this study are the amenities, cost and availability of infrastructure such as water and garbage and housing prices in the area, local land use plans, and the commute time to the major employment centers. In Chapter 3, the factors affecting growth were reviewed in detail. With the help of the growth model analysis in Chapter 4, the impact of changes in commute time due to Highway 1 improvements on growth inducement was reviewed. On the basis of this information the following conclusion of this study was determined.

The travel time savings discussed in Chapter 4 would be expected to increase growth pressures in two of the residential study areas compared with the other two. Under the TSM Build Alternative, there would be very little effect on residential growth pressures. The HOV Lane Build Alternative would increase growth pressures somewhat in Aptos and slightly in north Watsonville compared with Castroville and Fort Ord.

This analysis considers the travel time savings for the TSM and HOV Lane users for year 2035. As shown in Appendix A, the TSM Build Alternative would reduce time delays approximately two to 13 minutes, whereas the HOV Lane Build Alternative would reduce time delays by about six to 34 minutes. Under both build alternatives, Aptos and Watsonville residential areas would receive the most time savings. However, it should be noted that the commute times projected for year 2035 under the No-Build Alternative would range from six minutes to almost three hours (to certain job centers in San Francisco Bay Area) depending on the origin and destination location. Any increases in traffic, beyond that which is currently planned, would increase freeway congestion and, thus, would increase travel times. This by itself would act as a growth-detering factor.

While the amount of travel time savings could theoretically stimulate growth modestly, other factors in addition to traffic conditions also influence the climate for growth and prevent unplanned growth, such as land use plans and local attitudes toward growth. If accessibility to jobs were the primary factor in residential growth, many of these residential areas close to Highway 1 would currently be unable to control the size of their communities. The communities analyzed in this study plan implement strong land use controls to limit the amount and type of growth in their communities. For example, the City of Santa Cruz is currently 98 percent built-up and the city is supporting slow and modest growth through redevelopment of existing properties and infill development. The lack of available land in the cities and mid Santa Cruz County coupled with these types of land use controls would also help to ensure that the proposed project would not stimulate unplanned growth. Consideration of the Soquel to Morrissey Auxiliary Lanes Project in addition to the HOV Lane Project does not change this conclusion due to the minor additional time savings.

This growth inducement analysis was conducted with AMBAG projected population and employment data adopted in 2004, which show higher population and job growth than the AMBAG projections adopted on June 11, 2008, subsequent to this analysis. The use of the 2004 projections makes this growth analysis a worst cast since it results in higher projected growth pressures than are now expected to exist. In either set of AMBAG projections, Santa Cruz County and many of the jurisdictions in the Highway 1 corridor are projected to have higher job growth rates than their residential growth rates. These higher job growth rates combined with future housing development and relatively cheaper housing prices in Fort Ord, the City of Marina, and the City of Watsonville will reinforce the south-to-north commute pattern, drawing workers to the Santa Cruz area as well as to expanding job centers in Silicon Valley. Depending on the alternative and affected mode, the proposed HOV project combined with the Auxiliary Lanes project could reduce delays on Highway 1 considerably, potentially changing accessibility to jobs, and related growth pressures and trends. But these delay reductions would not be substantial enough to induce growth in the corridor. Instead, the proposed projects would support the growth based on general plans.

6.2 Expert Panel Input

After discussing the advantages and disadvantages of the proposed project, the general consensus of the expert panel was that construction of HOV lanes on Highway 1 would have minimal impacts on changes in the growth patterns for the selected residential areas. The panel indicated that the expansion of the Highway 1 would be insignificant with respect to land use. The constraints of land use policy and zoning make the growth supply driven not demand driven. The panel also noted that the corridor residents oppose additional neighbors and direct attention to issues such as water, highway and schools to get encourage cities and/or counties to restrict supply. In conclusion, the results of the study were consistent with the panel members' expectations.

6.3 Summary

Growth inducement potential has to be considered in context of the whole region to determine if a project has potential to accelerate beyond planned development or induce growth to shift from elsewhere in the region. The growth inducement analysis indicates that the Highway 1 HOV Lane Widening Project, which would save commuters substantially more much travel time in the corridor than would the Auxiliary Lanes Project, would not stimulate unplanned residential or related commercial growth but would support existing planned growth for the corridor.

The proposed Highway 1 HOV Lane Widening Project includes the Highway 1 Auxiliary Lanes Project (from Soquel to Morrissey) as part of existing conditions. This cumulative growth study found that the travel time savings achieved with both projects in place would not outweigh the local factors tending to inhibit growth. Hence neither the combined nor individual projects would stimulate unplanned residential or related commercial growth in the corridor. However, they would support existing planned growth for the corridor.

The reasonably foreseeable growth and land use change with and without the project is defined by the population and employment forecast data prepared by the Association of Monterey Bay Area Governments (AMBAG) and adopted in 2008. The project is not expected to influence the overall

amount, type, location, or timing of that growth. Nor is project-related growth anticipated to put pressure on or cause impacts to environmental resources of concern. Major factors preventing unplanned growth in the corridor include the lack of developable land in cities and in related county areas, strict land use regulations, and public attitudes towards growth.

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Appendix A Access Time to Employment Centers from Residential Centroids in Minutes

TABLE A-1 - TRAVEL TIMES BETWEEN CENTROIDS UNDER THE DIFFERENT ALTERNATIVES (IN MINUTES)

Alternative		Residential Zone-1 Aptos	Residential Zone-2 Watsonville	Residential Zone-3 Castroville	Residential Zone-4 Marina
Employment Zone 1 Santa Cruz	No-Build	37.0	56.3	64.8	78.5
	TSM	28.6	44.1	53.8	67.5
	HOV Lane	13.5	23.3	34.0	47.7
Employment Zone 2 Scotts Valley	No-Build	45.6	64.9	73.4	87.1
	TSM	37.0	52.4	62.2	75.9
	HOV Lane	21.5	31.2	42.0	55.6
Employment Zone 3 Watsonville	No-Build	25.3	9.6	23.5	37.3
	TSM	21.6	9.6	23.5	37.3
	HOV Lane	16.7	9.6	23.5	37.3
Employment Zone 4 Seaside	No-Build	50.2	43.6	23.1	12.4
	TSM	48.1	43.6	23.1	12.4
	HOV Lane	44.4	43.6	23.1	12.4
Employment Zone 5 Salinas	No-Build	49.8	48.5	21.0	24.4
	TSM	47.8	48.5	21.0	24.4
	HOV Lane	44.0	48.5	21.0	24.4
Employment Zone 6 Castroville	No-Build	29.8	23.0	6.0	17.1
	TSM	27.7	23.0	6.0	17.1
	HOV Lane	24.0	23.0	6.0	17.1
Employment Zone 7 San Jose	No-Build	89.0	108.4	102.8	117.2
	TSM	80.4	95.9	102.8	117.2
	HOV Lane	64.9	74.6	102.8	117.2
Employment Zone 8 San Mateo	No-Build	137.0	156.2	154.1	168.5
	TSM	128.3	143.7	154.1	168.5
	HOV Lane	112.7	122.4	154.1	168.5
Employment Zone 9 East Bay	No-Build	126.1	145.4	135.0	149.4
	TSM	117.4	132.9	135.0	149.4

	HOV Lane	101.8	111.6	135.0	149.4
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TABLE A-2 - TRAVEL TIME SAVINGS OF TSM AND HOV LANE ALTERNATIVES WHEN COMPARED TO THE NO-BUILD ALTERNATIVE (IN MINUTES)

	Alternative	Residential Zone-1 Aptos	Residential Zone-2 Watsonville	Residential Zone-3 Castroville	Residential Zone-4 Marina
Employment Zone 1	TSM	8.4	12.2	11.0	11.0
	HOV Lane	23.4	33.0	30.8	30.8
Employment Zone 2	TSM	8.6	12.5	11.2	11.2
	HOV Lane	24.1	33.7	31.5	31.5
Employment Zone 3	TSM	3.6	0.0	0.0	0.0
	HOV Lane	8.5	0.0	0.0	0.0
Employment Zone 4	TSM	2.1	0.0	0.0	0.0
	HOV Lane	5.8	0.0	0.0	0.0
Employment Zone 5	TSM	2.1	0.0	0.0	0.0
	HOV Lane	5.8	0.0	0.0	0.0
Employment Zone 6	TSM	2.1	0.0	0.0	0.0
	HOV Lane	5.8	0.0	0.0	0.0
Employment Zone 7	TSM	8.6	12.5	0.0	0.0
	HOV Lane	24.2	33.7	0.0	0.0
Employment Zone 8	TSM	8.6	12.5	0.0	0.0
	HOV Lane	24.2	33.8	0.0	0.0
Employment Zone 9	TSM	8.6	12.5	0.0	0.0
	HOV Lane	24.2	33.8	0.0	0.0